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China Report

SCIENCE AND TECHNOLOGY

No. 91



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2 April 1981

CHINA REPORT

SCIENCE AND TECHNOLOGY

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NATIONAL DEVELOPMENTS

BRIEFS

SHANGHAI SATELLITE CITY--Jiading County, an ancient city under the jurisdiction of Shanghai Municipality, is now becoming a satellite city of Shanghai combining scientific research and education with production. Many scientific and technological education units have already been established in Jiading, including the Atomic Nucleus Research Institute, Laser Research Institute, the Institute of Electronic Computation Technology, and the Shanghai University of Sciences and Technology. Some 50 plants have also been built with the light, textile and electronics industries as the major link in production. Jiading's population has increased from 28,000 in 1959 to 78,000 at present. Some 500 to 600 workers families from Shanghai are expected to settle in Jiading this year. [OW171455 Shanghai City Service in Mandarin 2300 GMT 16 Mar 81 OW]

GUANGZHOU SCIENCE, TECHNOLOGY CONGRESS--The 4-day Third Congress of the Guangzhou Science and Technology Association ended on the afternoon of 12 March. Before the closing ceremony, Liang Lingguang, secretary of the Guangdong Provincial CCP Committee and first secretary of the Guangzhou Municipal CCP Committee, gave a speech. The congress summed up the work of the association since the holding of the last congress, particularly since the resumption of science and technology work in 1978. The participants at the congress discussed the issues of how to speed up the four modernizations in Guangzhou and put forward many rational opinions and valuable suggestions. The congress elected democratically 99 committee members to be the Third Municipal Science Committee. In his speech, Liang Lingguang reaffirmed the scientific achievements of the people of Guangzhou and urged the party organizations at all levels to implement the policy of the intellectuals. [Guangzhou Guangdong Provincial Service in Mandarin 2345 GMT 13 Mar 81 HK]

HEBEI SCIENCE, TECHNOLOGY LECTURE--On the afternoon of 5 March, the Hebei Provincial CCP Committee held a lecture on science and technology in which the secretaries and standing committee members of the Hebei Provincial CCP Committee, the provincial governor and vice governors and other responsible comrades attended. Provincial Governor Li Erzhong presided over the lecture. Professor (Cui Enxue), vice president of the Hebei Normal University, gave a brief introduction on the history of the development of science and technology. It is planned that this lecture will consist of a total of 10 sessions and each session will examine a different topic. The topics of the sessions are a brief history of science and technology, energy resources, agricultural science and technology, water resources, industrial resources, management of enterprises, modernization and environmental protection, financing socialist commerce, the computer and new developments in science and technology and the role of mathematics in modernization. [Shijiazhuang Hebei Provincial Service in Mandarin 0430 GMT 6 Mar 81 HK]

CSO: 4008

APPLIED SCIENCES

PRINCIPLES OF STEALTH AIRCRAFT TECHNOLOGY EXPLAINED

New Structural Materials

Beijing HANGKONG ZHISHI [AEROSPACE KNOWLEDGE MAGAZINE] in Chinese No 1, Jan 81, pp 9-10

[Article by Liu Kan (0491 0170) and Xiao Guang (2556 0342)]

[Text] The configuration of the stealth aircraft sets it apart. The wings are shaped like horns. The intake duct is neither in the belly nor on the side, but rests atop the rear of the aircraft. The tail, is also unlike the vertical tails on standard aircraft, is a strange-looking "V".

In modern warfare, rapid developments in military electronics technology are making the combat environment of the airplane more complex day by day. In addition to being threatened by firepower from the air and ground, and intense jamming, its every move is the subject of close scrutiny by radar, photoelectric, and other detection instruments. So improving an aircraft's combat effectiveness and survivability has been the major goal of aircraft design since the 60's.

Radar, which is commonly known as the 1000-li eye, is the process of target acquisition by retrieval of the echo of electromagnetic waves one has generated.

The air defense systems of most countries have radar surveillance nets which scan the skies day and night for encroaching aircraft. For the aircraft, how to avoid the eyes of the radar has become the key to penetrating the defenses. So there now have appeared aircraft which penetrate by flying at extremely low altitudes, taking advantage of the radar's blind area. Naturally, the technology and equipment to guarantee the super-low flight capabilities of such aircraft have to be provided for during the design stage.

Where there is a spear there must be a shield, so to counter penetration by low flying aircraft, the defense puts radar in its aircraft and directs it downward, which naturally takes care of the problem of low-altitude blind spots. America's E-3A AWAC's are of this type. Military needs being what they are, people think that to keep the radar from detecting a penetrating aircraft, or to have the discovery be too late for air defense measures to be taken, would be ideal. With the rapid advances in modern electronics technology, there are two methods which are feasible. One is to "blindfold" the eyes of the radar, and the other is to make oneself "invisible." Everyone is already quite familiar with the former, that is, the use of electronic countermeasures to confuse the radar. One can direct high-power interference at the radar so that the radar echo is lost amid the noise, or

you can use deceptive interference to give the radar a "false impression," which is tantamount to blindfolding it. The second method is to hide. Here "hiding" is not used to mean commonplace camouflaging, but rather means figuring a way to reduce to a minimum the radar echo of the aircraft. To have no echo at all would be best, but obviously this is impossible; all that can be done is to make it relatively weak. If the radar does not receive any echo, or if the echo is extremely faint, it is "very nearsighted," if not "blind." This is the kind of thinking that has guided the development of the stealth aircraft.

Unique Appearance

The reason the stealth aircraft does not look like other planes is because of its unconventional design, which is based on the special characteristics of radar wave reflection. There are obvious demarcation lines between the wings and the body of conventional aircraft, and it is these edges and angles that often create strong reflection of radar waves. To handle this problem, they have adopted monocoque construction, with a smooth transition between the wing and fuselage. Thus, in keeping with the principles of mirror reflection, most of the radar waves hitting the aircraft are scattered into the air, with very few returning to the radar set. As for the aerodynamic configuration of the aircraft, wind resistance has been reduced, which in turn increases the plane's speed. Taking into account the downward surveillance capabilities of airborne early warning craft, the "V"-shaped tail and the elliptical fuselage are fairly well suited to low-altitude supersonic penetration, and the folding-wing, flat-bottom triangular cross-section fuselage is suited to high-altitude supersonic penetration.

Piggyback Intake Duct

An aircraft's intake duct is an area of strong radar wave reflection. To reduce radar exposure, the intake duct has been placed atop the back of the fuselage. In this way, it is shielded by the fuselage, and as only a minuscule number of electromagnetic waves reach the top of the aircraft, the reflection is enormously reduced.

Fully Concealed Cockpit

The cockpit of a conventional aircraft is a bubble-like protrusion which can send back strong radar reflections, and this is not very conducive to concealment. The cockpit of the stealth aircraft is fully concealed in the fuselage, which eliminates strong reflections.

"V"-Shaped Tail

Taking into account the incidence of ground radar, the "V" shape results in most of the electronic waves being dispersed. (see back cover)

"Transparent" Wings

The stealth aircraft has flat bottomed, delta wings which are covered with a radar absorbing layer so that no part will reflect radar waves. That is to say, as far as radar is concerned the wings are "transparent," so the "stealth aircraft" is also known as the "transparent aircraft."

Improved Propulsion System

Infrared guided missiles are one of the major threats to penetrating aircraft. The missiles are equipped with infrared detectors to pick up the infrared energy radiated by the aircraft and home in on the target. The following are some of the improvements in the propulsion system of the stealth aircraft: A turbofan engine. The engine is designed to be as quiet as possible. In addition, there is an infrared filter installed in the tailpipe, so that the so-called dual exhaust can reduce infrared radiation by 90 percent, which is the same as reducing the infrared detection distance by 45 percent. The opening of the tailpipe has a strange configuration so as to alter the wave length of the infrared waves. This has the effect of "detuning" the infrared detector. An improved fuel-injection method. They have employed a vaporization nozzle and a pneumatic spray nozzle so that the fuel is completely burned. This reduces infrared exhaust and contrail. There is a small hole in the lining which serves to regulate the cold air flow as well as reducing sonic resonance. The engine housing and the combustion chamber casing, etc., are of a honeycomb construction to absorb noise.

In addition, the stealth aircraft has a rotary intake duct which serves to bring together the positive and negative ions created by the high speed air flow, so that the tailpipe exhaust does not give the radar a good picture.

New Structural Materials

A combination of advanced compounds and electromagnetic wave absorbent material, this is known as "structural electromagnetic wave absorbent material." The relative strength and rigidity of the advanced material is far greater than traditional aircraft structural material. It is lighter, stronger, and more fatigue resistant. The weight is only one-fifth that of steel, and one-half that of aluminum, but its strength is actually comparable to steel, and twice that of aluminum. More striking is that its fatigue resistance is much higher than that of steel or aluminum. The electromagnetic wave absorbent coating has an absorbent layer of Li-Cd-Fe-O material. Into a high-strength bonding resin is doped a new kind of absorbent layer of half-wavelength, electricity-conducting fiber, which is doped with carbon black, ferromagnetic ores, Fe-O materials and rubber-based absorbent materials, as well as foam and ceramic Fe-O materials, radioactive isotopes, etc. Different absorbent materials are applied to the surface of the parts of the aircraft which are made of different metals, to further absorb radar waves.

The radar waves reflected from the stealth aircraft (see inside back cover) are concentrated in a perpendicular direction within a very narrow angle. If there is an included angle between the radar station and the aircraft, then as we can see from the reflection illustration, the reflection will be extremely weak.

For example, just as the aircraft dives, it is in the peak blind area of the radar. If the radar of an early warning aircraft is to detect this aircraft, it is possible to do so only within a very small angle. Furthermore, because both the early warning aircraft and the penetrating aircraft are traveling fairly fast, it is relatively easy to slip past without being detected.

This stealth technology is also applicable to fighters, cruise missiles, warships, tanks, and other armaments. The developments of this technology undoubtedly poses a serious challenge to air defense systems, and has given radar and other detection equipment new and more complex problems to solve.

In evaluating the military significance of this new technology, American Secretary of Defense Brown pointed out, "To build even a limited number of 'invisible' bombers, missiles, and fighters is enough to give the United States inestimable retaliatory superiority in nuclear or conventional warfare." "It possesses extraordinary military significance."

Technology Explained

Beijing HANGKONG ZHISHI [AEROSPACE KNOWLEDGE MAGAZINE] in Chinese No 1, Jan 81, pp 10-11

[Article by Wang Zhenwu (3769 2182 2976): "The Stealth Aircraft"]

[Text] According to what has been revealed in foreign literature, the United States has successfully developed and tested a new kind of "stealth" aircraft, an illustration of which is shown in Figure 1. This type of aircraft can foil the "1000-li eye" radar. The U.S. Secretary of Defense is of the opinion that the successful development of this kind of aircraft would be a "tremendous technological advancement which would effectively alter the military balance of power."



Figure 1. Stealth aircraft

Following a decades-long pregnancy, the birth of the stealth aircraft was a very "difficult labor." After the Second World War, various types of radar were developed one after the other. Radar was the aircraft's guide. It was also its executioner. Aircraft relied on their own radar for guidance in flight and could be held in the deadly grip of the enemy's fire-control radar. Because of this, how to blind enemy radar became a preoccupation with electronic warfare technical personnel. Series after series of electronic countermeasures followed one another. People naturally pondered the possibility of using "stealth technology" to conceal aircraft from the "1000-li eye." But, as it turned out, this was no easy undertaking. The United States undertook the actual development of "stealth" technology back in the 1950's. Following more than 20 years of secret development, present "stealth" technology is capable of making an aircraft invisible, blinding the

"1000-11 eye." What is the secret? To unravel this mystery, one must begin with how radar is able "to see" an aircraft. That radar can see an aircraft is due to the fact that radar emits an electromagnetic wave. After this wave encounters aircraft, it is reflected, picked up by the radar and displayed on a scope (as shown in Figure 2). Because of this, the secret of stealth technology lies in the making of a "non-returnable" electromagnetic wave.

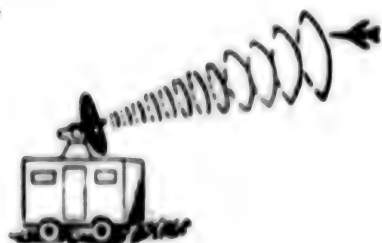


Figure 2. Reflection of electromagnetic waves after encountering an aircraft.

Today, "stealth" technology can be used in the following ways:

Reduced "Shadow"

Everyone knows that his own shadow is very long in the early morning and late afternoon. At noon, the shadow is reduced drastically. Obviously, the shadow is not the same size as the body. The size of the shadow--except for its relation to the body--is related to the angle of the light and the posture of the body, etc. In essence, when radar spots an aircraft, what it is seeing is the reflected electronic wave, or "shadow," from the aircraft. This shadow is known as the effective reflection area. This effective reflection area is related to such factors as the actual area of the physical body, the electrical properties, and the structure. If an aircraft can achieve total "non-return" of the electromagnetic waves, then its effective reflection area has been eliminated. In effect, this aircraft has no shadow and leaves no trace. Things today have not reached this point, but every effort is being made to devise ways to reduce the "shadow."

The stealth aircraft developed by the United States is a departure from conventional aircraft whose angles and flat surfaces easily reflect electromagnetic waves, and has a modified engine intake. The object here is to jumble the signals emitted by the radar. As the electromagnetic waves are emitted, they encounter obstacles (aircraft, etc.) en route and are reflected. When the dimensions of the obstacle exceed that of the electromagnetic wave and the [obstacle's] surface is smooth, a reflection occurs according to the laws of optics. But if the surface is rough, there is a "scattering" effect as shown in Figure 3. The degree of scattering, the physical surface configuration, the angle of incidence of the electromagnetic wave and its wavelength are interrelated.

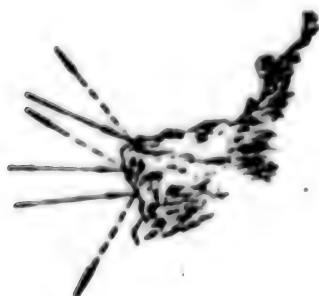


Figure 3. Rough surface, irregular reflection.

Obviously, assuming that it does not affect the performance of the aircraft, a properly designed external structure will disrupt and scatter the electromagnetic waves, create mutual interference and reduce the effective reflection area.

Wearing "Invisible Clothing"

The outer cover and structural members of modern aircraft are made of metal. Metal is an ideal reflecting material for electromagnetic waves. One good way to reduce the electromagnetic wave reflection is to provide the aircraft with "invisible clothing." Although a good method, the "clothing" is difficult to find. It is obvious that this clothing absorbs electromagnetic waves and there is an abundance of such material. But because of the characteristics of aircraft, the "fabrics" that can be used for the "invisible clothing" are few. It is not entirely clear exactly what fabric should be used. Introduced below are several kinds of foreign publicly [advertised] absorbent coatings:

Radioactive isotope coatings: Coating the surface of an aircraft (rocket or missile) with radioactive isotopes. When an aircraft flies at high speeds, the isotope layer radiates high-velocity particles (α, β), constantly bombarding the ions in the surrounding atmosphere to create a layer of ionization. The density and distribution of the ions in the plasma shield are greatest near the surface of the aircraft, diminishing gradually with distance from that surface as shown in Figure 4. At the outermost layer of the plasma shield, the electron density is near zero. This guarantees an excellent matching of the plasma shield and free space and practically no scattering of the electromagnetic waves. Even if electromagnetic waves are present, because the waves are refracted, reflected, and diffracted, frequency and phase shifts are produced which cannot be received by radar. Among the radioactive isotopes now available, the α -particle is the best choice. Therefore, pure α -particle radioactive emitters such as polonium-210 and curium-242 are used in the radioactive coatings.

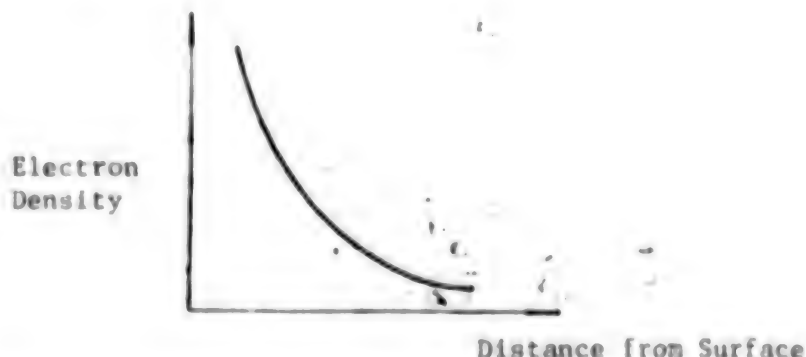


Figure 4. Electron density of plasma shield diminishes with distance from surface.

Plastic coatings: At the 1974 Farnborough International Aerospace Exhibition and Flying Display, one American company displayed some new lightweight, flexible, thin foam absorbent materials that could be used to coat the fuselage of a small aircraft. In the centimeter wavelength range, the electrical level of the reflected wave signal is reduced to approximately one-fiftieth. This greatly reduces the effective reflection area. This company has also developed the MC-75, SF-RB and other coatings.

Fe-O coatings: The U.S. Air Force has already developed 0.25-1 centimeter Fe-O coatings used on metallic surfaces. Its effective reflection area is very small; it employs lithium-cadmium-Fe-O in the centimeter wavelength range. For shorter wavelengths, nickel-cadmium-Fe-O is used.

The introduction to the above coatings helps us to understand what "invisible clothing" should be used to coat an aircraft. Some of the new composite coatings are being secretly developed. No matter what the new "invisible clothing" is, it must be light, thin material resistant to high temperatures.

Shedding Old Clothing

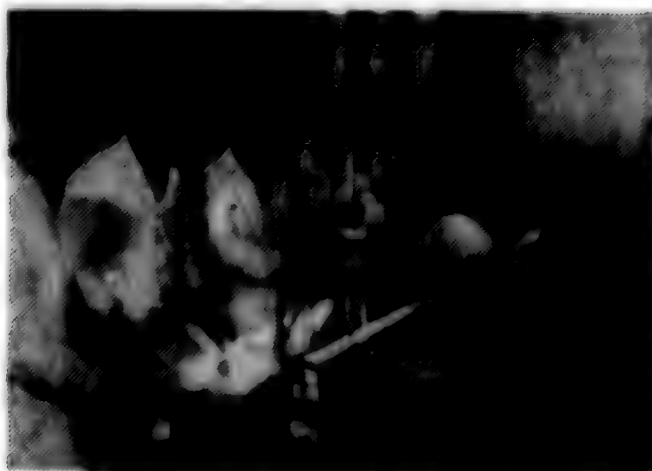
Providing an aircraft with "invisible clothing" makes radar detection difficult, but even this is not enough. There is an even more basic method, namely achieving stealth by "shedding the old clothing." After a great many experiments, people came to believe that it was possible. This so-called "shedding the old clothing" was simply using plastic or non-metallic absorbent materials to replace the aircraft's metallic covering and structure. We know that electromagnetic waves are bounced back when they encounter a physical body because the dielectric constant of the boundary of the atmosphere and the physical object is different. If it were possible to find a material similar to the atmospheric dielectric constant and use it for the aircraft's fuselage and structure, then the resulting aircraft would be invisible to radar. But since aircraft operate at high altitudes and high speeds, there are several requirements made of its "physique" such as structural rigidity, strength, heat resistance and resistance to corrosion. Because of this, there have been no public reports to date about an ideal absorbent material that can make an aircraft "shed its old clothing." However, there has been tremendous development of the load-bearing parts. The North American Rockwell Company used structural parts developed from a new composite absorbent material on the F-111 for over 200 hours with excellent results. This company has developed a composite material for jet engines consisting of a honeycomb structure made of absorbent materials of dissimilar electrical properties. To satisfy specs, the laminated layers are packed and pressed so that the outermost layer has the smallest radiation coefficient. This light-weight material has excellent hardness, strength and heat resistance. The U.S. Air Force Materials Testing Office has used a new absorbent material to make experimental engine cowlings. This inexpensive material has performed beautifully after hundreds of hours of flight testing.

APPLIED SCIENCES

LASER RESEARCH CENTER IN HARBIN COMPLETED

Beijing RENMIN RIBAO in Chinese 27 Feb 81 p 1

[Photograph and caption]



The Heilongjiang laser infrared experimental center in Harbin is now finished and has recently become operational. This experimental center will specialize in the research and development of laser infrared technology. Shown is the laser research team's S&T personnel analyzing the effectiveness of a laser wood-cutting experiment.

CSO: 4008

LIFE SCIENCES

IMPROVING LEPROSY PREVENTION, TREATMENT METHODS SOUGHT

Villages Outdated

Beijing GUANGMING RIBAO in Chinese Feb 81 p 2

[Article: "Leprosy Should Not Be Feared; Method of Prevention and Treatment Should be Improved:]

[Text] Whenever leprosy is mentioned, a terrible image may come to mind. It is believed to be an incurable disease. Once one is inflicted, his life is over. In reality, this is a misunderstanding.

Leprosy is a chronic infectious disease caused by a leprosy bacillus (*Mycobacterium leprae*), which may be isolated from the mucous membrane or the wounds on the skin of the victim. It is contagious; therefore, it is called infectious leprosy. This type involves about 39 percent of all leprosy victims. In tuberculoid leprosy, the bacillus cannot be detected and the disease is not contagious. It is called noninfectious leprosy, involving about 50 to 70 percent of the leprosy victims. Leprosy spreads through intimate contact with a victim or through the saliva of the victim. A condition of prolonged weakness of resistance makes it easier for a person to be infected. The incubation period is generally 3 years; in some individual cases, it may be as long as 30 years.

Leprosy is not extremely contagious. According to written records, China has had a history of leprosy cases for more than 2,000 years, but to date there are only 200,000 victims. This fact indicates its low communicability and extremely low rate of incidence. There is, therefore, no basis to be fearful of leprosy.

In the early period of liberation, China had about 500,000 leprosy victims. Prevention and treatment work in these 30 plus years has produced obvious results. Now, then, is the work of preventing and treating leprosy to be strengthened? Before this question is answered, the past history should be reviewed first.

In the past there were many disfigured victims in the late stage of the disease. This caused intense terror among the people, who voluntarily put all leprosy victims in one village to isolate them from the healthy. This is how leprosy villages were formed. In China, leprosy villages began to be established in the Tang Dynasty [618-907 A.D.]; in Europe, they began in the 14th century. In those times, people did not understand this disease and there was no effective method of treating it. Before liberation, the leprosy villages in China were mostly

operated by foreign missionaries. Since liberation, this form of management has continued to this day. In the past, the characteristics of leprosy bacillus, the ways and principle by which the disease spread were not very well understood. The treatment method was mainly to use Chaulmoogra oil. The effect was very minimal. Therefore, leper villages remained as the major form of prevention and treatment. This is an historical necessity, and is right. We also must acknowledge the fact that by using this form of management, the number of leprosy victims, 500,000 at the beginning of liberation, has been reduced by half. When this method was being carried out, most of those who engaged in the work of fighting leprosy felt that it was not a perfect solution. It is very difficult to say whether the goal of true isolation is possible. It brings a great deal of difficulty to the victims, the medical personnel, and the state. Once a leprosy patient enters a village, it is like being permanently separated from his family, and limits are imposed on the schooling of his children and the social activity of his family. The state also has to provide considerable financial support to this type of family. When the patient is cured and the physician has given him a certificate, no one outside the leprosy village will admit him. These facts indicate that the form of isolation with the establishment of leper villages brings to the patient overwhelming pressure and difficulty. A patient does not want to accept this form of treatment unless he is forced to or he just has no choice at all.

For the medical service personnel, there is also a great deal of difficulty. A leper village is generally located in a mountain canyon, inconvenient to reach, with low cultural and living standards. Society looks down upon the leper and this discrimination extends even to physicians who treat lepers. Some [physicians] cannot find anyone to marry and some cannot find a school for their children. There is a great problem for those whose job it is to prevent and control leprosy. Although by enduring all sorts of hardships to visit every village and every household to carry out a leprosy survey, they may be able to reach as many as 98 percent of new cases, yet it is the remaining 2 percent that is the major source of infection. They [the remaining 2 percent] hide themselves from general surveys, because they do not want to enter a leprosy village.

The above conditions demonstrate that using the form of leper villages of the middle ages as the method of preventing and treating leprosy now and in the future is undoubtedly much too backward. Statistically, the benefit of true isolation is doubtful as well. For example, before victims of the infectious type leprosy are discovered by the leprosy surveyors, 47 percent have as long as 6 years of free contact with other people. Judging from the most recent survey data of leper villages of 44 counties in Yunnan Province, there are 362 healthy children who come with their mothers to live in a leper village. These facts demonstrate that this form of isolation is not reliable, because difficulties unresolved by the method of establishing leper villages exist.

During their period between the 60's and the 70's, several drugs effective for treating leprosy have been discovered, including diaminodiphenylsulfonum [DDS], Rifampicin, chlorophenazine, etc. When these drugs are suitably combined for treatment, the leprosy bacillus of the nodular type may be changed into the granular type with no ability to infect, within half a year. New advancements are also being made in highly effective drugs for treating leprosy, such as Fanyingting [?] cortical steroids, Tripterygium wilfordii, etc.

The aforementioned facts show us that at present a firm foundation has been gained regarding the prevention and treatment of leprosy, treatment of reaction to leprosy, and preventive drugs for those who are in intimate contact with lepers. The author believes that the time has come to abandon the use of leper villages as a form of isolation. The convenient conditions provided by today's scientific progress should be utilized bravely to allow lepers to live with their families just like ordinary patients and to go, voluntarily and periodically, to the dermatology department of the local hospital for examination and treatment. At the same time, preventive drugs should be administered to those who are in close contact with them. This form is called chemical isolation. In this manner, the difficulties of the victims, the medical service personnel, and the state due to the old form of isolation will be eliminated by the new form of chemical isolation. On the average, the state needs only to pay the expense of 40 yuan for each leper every year to obtain the result of early discovery, early treatment, and early cure of leprosy victims. As the situation stands now, to treat a leper in a leprosy village the cost is 800-1,000 yuan per year. Leprosy is the mark of backwardness. It is incompatible with civilization. A modern civilization should not have leprosy. The author believes that in the future with propaganda of scientific knowledge concerning leprosy, strengthened leadership, and adoption of the new chemical form of isolation, it is entirely possible for China to become a leprosy-free civilized country before the year 2000.

New Treatment Method

[Article: "Yunnan Tries New Ways To Step Up Treatment and Prevention of Leprosy"]

Beijing JIANKANG BAO in Chinese 22 Jan 81 p 2

[Text] Centering upon readjustment, the Yunnan Provincial Committee and Provincial People's Government prepare to strengthen the work of preventing and treating leprosy and to test a new method of combining isolation and treatment in leprosy hospital-villages and drug isolation and treatment at home for the purpose of controlling and eliminating leprosy.

Yunnan Province is currently one of the provinces in China where the conditions of leprosy is relatively severe. Due to the decade of catastrophe, leprosy spread. Many hospital-villages were not well managed. In some of these hospital-villages, 70 percent of the patients suffer from ulceration of limbs. Some lepers scatter around in society and no one cares for them. In some areas, leprosy camps have appeared, being a free association organized by lepers. For the purpose of turning this situation around so as to accelerate the control and elimination of leprosy, the Yunnan Provincial CCP Committee Secretary, Liu Minghui [0491 2494 6540] took part in a Leprosy Work Symposium for discussing preventive and control measures. Deputy head of the province Ma Wendong [7456 2429 2639] supervised the revision of the document concerning the work of further strengthening leprosy prevention and treatment. The document, issued in the name of the provincial government demands the various localities to provide the necessary manpower, money, and concerted efforts of related departments to produce results in a short period of time. Most recently, the provincial Department of Public Health called the heads of public health bureaus of the various districts, counties, and cities to a conference to study, concretely, the policy of combining hospital-village isolation treatment and drug isolation treatment at home, with treatment at home as the primary form.

The arrangement of leprosy hospitals and villages of the entire province is to be adjusted to combine those that are crowded and those that have very few patients. Some hospital-villages are set aside to form old-people's villages to house those patients who are cured of leprosy but have no home to go back to, no one to depend on, and no way to maintain a living (the 3-no's). All hospital-villages are clearly designated primarily for treatment. Various systems are made better and the quality of medical treatment is improved. The past mistake of some hospital-villages in emphasizing production to result in ulceration of the four limbs even to the extent of being disabled is changed. It is also clearly decided that in the future the hospital-villages will admit mainly the nodular type and the borderline type, those suffering from severe leprosy reactions, and those in need of corrective surgery. Those who are being treated at home should have a complete prevention and treatment organization. The cadres should have a correct understanding of leprosy and should guarantee the condition of guaranteed treatment and management. At the same time, the family members who have intimate contact with the patient should be given preventive drugs. At present, those who are treated at home are mainly the tuberculoid type patients.

Personal training and strengthened propaganda education are the important key to leprosy prevention and treatment. In Yunnan, from the provincial realm to the production brigade, learning classes are being organized at every level to train physicians of leprosy hospitals and stations, parttime specialized physicians, and barefoot doctors, who are to explain to the leaders, medical personnel, and the society that leprosy is nothing to be afraid of. If it is discovered early and treated early, it can be cured and deformity can be avoided. In this manner, society's discrimination against lepers may be eliminated and the mistaken notion about leprosy of several thousand years may be turned around.

In order to discover and treat patients early, Yunnan also stipulates in "the Method of Awarding Reports of Leprosy Patients" that those who discover and report a patient (including the patient voluntarily report himself) are to be rewarded 10 yuan. If a leper reports himself, he gets the reward money as well as free treatment.

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CHINA CONDUCTS MASSIVE DIABETES SURVEY

Shanghai JIEFANG RIBAO in Chinese 21 Feb 81 p 1

[Text] Led by the Huashan Hospital of the First Medical College of Shanghai, the treatment and research units of 15 provinces and municipalities have cooperated over a 2-year period in carrying out a diabetes survey of 400,000 people nationwide. In addition, they have recently categorized China according to the incidence and distribution of diabetes, providing valuable data for the prevention and study of this disease. This is the first survey of such magnitude in China.

In the past there have been no surveys of the incidence or distribution of diabetes in our country, and the data needed to conduct such a study was lacking. In 1978, the Huashan Hospital, along with 11 affiliated medical treatment and research units carried out a diabetes survey involving 100,000 people in Shanghai. In October of 1979 at the First All-China Diabetes Research Conference held in Lanzhou, Huashan Hospital was designated the responsible unit to work with Beijing, Heilongjiang, and 12 other provinces and municipalities in selecting representative areas or groups and, using standardized methodology, criteria, records, and whole-group sampling, to carry out a survey of 300,000 people in 14 provinces and municipalities. In addition, they categorized the incidence of the disease according to region, nationality, occupation, age and sex.

Among the 300,000 people surveyed, the actual incidence of the disease was 0.61 percent. At the same time it became clear that there was no marked difference between males and females in the incidence of the disease. As for age, the rate climbed sharply after age 40 and peaked between 60 and 70. With respect to body weight, overweight persons of every age group had a clearly higher incidence of the disease than those of normal weight in every age group, further confirming that obesity in adults is the major factor contributing to diabetes.

As for occupation, the cadre groups had the highest incidence, while students and pre-school children had the lowest disease rate. As for differentiating among regions, it appears that the differences are related to living habits, living standards, and intensity of labor. At the same time it was discovered that China's diabetes rate is lower than that of Europe or the United States, which may be related to the living habits, diet and nutrition, racial group, heredity, intensity of labor, and economic level of the people of our country.

The data obtained from this large survey has attracted attention from diabetes specialists and epidemiologists around the world, who believe that it has reference value for the countries of the world in studying and fighting diabetes.

BRIEFS

CANCER DRUGS--On page 1 of the 17 November issue of this evening newspaper, there was an article reporting "Guangxi has a tree capable of resisting cancer." Six species of plants belonging to the Genus *Meidengmu* [*Maytenus*] have been discovered in Guangxi. [The news] has drawn the attention of everyone, because to date cancer remains a disease threatening the life and health of people. According to statistics, in China, about 700,000 persons die of cancer every year. The danger of cancer to the health of mankind is obvious. How was it discovered that *Meidengmu* can resist cancer? In the early 60's, there was a physician by the name of Kupuqian [transliteration] at the University of Virginia who discovered, in the process of selecting cancer-resistant drugs, a plant growing in Ethiopia by the name of *Meidengmu* [*Maytenus hookeri*], the fruits and the root tubers of which contain a very active anticancer property. The quantity of this material is very small; a very minute amount, indeed. The work, therefore, was very difficult. It was not until 1972 that he announced the successful extraction of a highly effective and highly safe anticancer substance of low toxicity. It is called Maytenin, which is an alkaloid. This important discovery immediately drew the attention of all those in the world engaged in oncological research. In 1975, the U.S. National Cancer Institute officially announced that a large quantity of pharmacological experiments proved that Maytenin is indeed a promising new anticancer drug. Its anticancer action is 10 times that of the famous VLB [alkaloid of Vinca] with some people believing it to be several tens of times higher. What makes Maytenin even more valuable is its low toxicity and high safety. How much Maytenin is in fact contained in *Maytenus*? The figure may really frighten you. It is almost as minute as possible. The content is less than 0.02 to 0.2 percent. To illustrate this quantity, let us explain that in order to obtain Maytenin weighing 2 g, raw materials weighing 10 tons are needed. The research work is, therefore, similar in difficulty to the discovery of radium by Madame Curie. Most recently, someone discovered in South Africa a species of *Maytenus* named *Boteweimao* [transliteration] containing as much Maytenin as 12 mg/kg, an increase of 60 fold. This is a very newsworthy development. The Chinese researchers of the Yunnan Provincial Institute of Tropical Botany found the Genus *Maytenus* in Xishuangbanna forests as early as 1972, and with the help of other research organizations, extracted Maytenin very quickly. At present, decoction, injection, and tablets have been successfully made of the drug for clinical application. The people are urgently expecting scientists to produce more and better anticancer drugs to resolve the serious problem of cancer threatening the life and health of mankind. [Text] [Guangzhou YANGCHENG WANBAO in Chinese 14 Jan 81 p 3] 6248

ANIMAL CANCER--According to a report in NANFANG RIBAO, Chen Yuhua [7115 3768 3352], instructor of the Department of Veterinary Medicine of the South China College of Agriculture, in cooperation with Chen Zhuohuai [7115 3504 2037] an instructor and Xiao Zhende [5135 2182 1795] a physician of the Institute of Oncology of Zhongshan College of Medicine obtained results from their study on spontaneous tumors of domestic animals and fowl. They have identified spontaneous rhinopharyngeal cancer, sinus paranasalis cancer, mouth cancer, cancer of the mammary gland, colon cancer, and cancer of the nasal cavity of swine, kidney cancer and intestinal cancer of chickens, external genital cancer of deer, and cancer inside of round cells of fish. These 10 types of animal cancer were reported for the first time in China and they have never been recorded in foreign countries either. Their research results were certified in the end of October, last year. The three researchers began to carry out survey and study of spontaneous tumors of animals together in 1975. They went to more than 20 counties and cities of the various districts of Guangdong Province to dissect water buffaloes, oxen, pigs, chickens, ducks, geese, goats, deer, and fish numbering in the thousands in the course of several years to reveal 27 types of tumors, most of which were malignant. Domestically, this was the first extensive survey of tumors of domestic animals and fowl. One of the blanks of research in China was thus filled. Specialists who participated in the Certification Conference believed that the survey and study of spontaneous tumors of domestic animals and fowl are to meet the urgent needs of strengthening animal husbandry production and developing the work of inspecting meat products. These studies will also provide important clues for pathogenetic research on human cancer. In the process of study the three collected a great deal of data relating to epidemiology and pathogenesis of animal tumors and also made sample specimens of various types of cancer of domestic animals and fowl. [Text] [Beijing GUANGMING RIBAO in Chinese 13 Feb 81 p 2] 6248

SHANGHAI NUCLEAR MEDICINE RESEARCH--Shanghai, 14 Mar (XINHUA)--China's First Research Institute of Nuclear Medicine has been set up in the Shanghai No. 1 Medical College. It has five laboratories, three of them researching basic nuclear medicine, nuclear pharmacology and nuclear medicine for tumors and two others based at the Zhongshan and Huashan Hospitals in Shanghai, researching clinical nuclear medicine. The Research Institute also intends to set up a medical nuclear physics laboratory and a central radio-nuclide kit laboratory. [Text] [OW140819 Beijing XINHUA in English 0739 GMT 14 Mar 81 OW]

ANTICANCER VACCINE ISOLATION--Shanghai, 11 Mar (XINHUA)--Medical researchers in Henan, Beijing and Shanghai have made a new step forward in treatment of cancer with their isolation of a family of bacteria--anaerobic propionibacterium acnes in bone marrow, it was learned from medical circles here. Preparations from the bacteria has demonstrated a remarkable facility in the reduction or elimination of certain types of cancer when used in tandem with other conventional treatments. Lung, skin, breast and nasopharyngeal carcinoma, as well as malignant exudate surrounding the lung, have all been treated effectively with the injection. In initial trials in the 2 years in a dozen hospitals throughout the country, 700 patients demonstrated at least a prolonged survival period. Shanghai's Third People's Hospital reported a 96 percent effective rate in 51 patients with malignant pleural effusion. The Beijing Tuberculosis Hospital reported that several intrathoracic injections (injections into the chest) resulted not only in disappearance and prevention of accumulation of pleural effusion and abrogation of cancer cells, but also prolongation of survival period. Eighteen lung-cancer patients who received injections before operation have been symptom free for 18 months and are being closely monitored. [Text] [Beijing XINHUA in English 0700 GMT 11 Mar 81 OW]

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

BRIEFS

CAS DEGREE COMMITTEE--In order to strengthen leadership and management of the conferment of academic degrees, the Degree Committee of the Chinese Academy of Sciences was formally established on 24 February, with Feng Depei [7458 1795 1014] as the chairman and Huang Kun [7806 2492] and Zhang Wensong [1728 2429 2646] as vice chairmen. The other members are: Ma Dayou [7456 1129 3731], Ma Xingyuan [7456 2622 0997], Wang Zhijiang [3769 0037 3068], Ye Duzheng [5509 4648 2973], Yan Dongsheng [0917 2639 3932], Wang You [3076 3731], Wu Jikang [0702 0413 1660], Wu Wenjun [0702 2429 0193], Wu Zhonghua [0702 0112 5478], Li Xun [2621 5651], Chen Biao [7115 1753], Zou Chenglu [6760 2110 7627], Zhang Zhiyi [1728 5268 0001], Tu Guangchi [3205 0342 3589], Guo Musun [6753 1970 1327], Tan Haosheng [6151 6964 3932], Qian Renyuan [6929 0086 0337], Qian Zhidao [6929 1807 6670], Qian Linzhao [6929 5259 3564], Huang Bingwei [7806 4426 4850], Cao Tianqin [2580 1131 2953], Zeng Chengkui [2582 0701 1145], and Peng Huanwu [1756 2719 2976]. [Beigjin RENMIN RIBAO in Chinese 27 Feb 81 p 1]

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- A Study of Complexes of Au(I) with Thiourea by the Solubility Method.....Zhang Jianmin [4545 0256 3046], Metallurgical Institute of Nei Monggol, Hohhot; Yang Bingyu [2799 0014 7183], Liu Chuansheng [0491 0278 0524] and Xu Cunsheng [1776 1317 3932], all of the Metallurgical Institute of Jilin Province, Changchun (521)
- A Study of Anodic Stripping Voltammetry of Trace Tellurium on Gold Film Electrode.....Deng Jiaqi [6772 1367 4388], He Peixin [0149 0160 9515] and Chen Xiaoming [7115 2556 2494], all of the Department of Chemistry, Fudan University, Shanghai (529)
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- Synthesis of 19-Nor-16-Methylene-17 α -Acetoxy-Progesterone and Its Δ^6 Analogue.....Liao Qingjiang [1675 3237 3068] and Huang Minglong [7806 7686 7893; deceased], both of the Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences (551)

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- On the Structure of Daijisong.....Chen Zhongliang [7115 0112 5328], Shanghai Institute of Materia Medica, Chinese Academy of Sciences (567)
- The Constituents of the Essential Oil from the Flowers of Lonicera japonica Thunb.....Wu Yuanliu [0702 0337 9497] and Fang Hongju [2455 3163 6880], both of the Institute of Materia Medica, Chinese Academy of Medical Sciences, Beijing (573)
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- A New Reagent System for the Splitting of Ether Linkage.....Huang Weiyan [7806 4850 0997] and Liang Weixi [2733 5588 3356], both of Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences (592)
- Synthesis of dl-Muscone through Acyloin Cyclization.....Yao Qianyan [1202 0051 0337] and Chen Xue [7115 7185], both of Shandong Institute of Traditional Chinese Medicine, Jinan; Gao Zhaorun [7559 0340 3387] and Zhao Wenzhi [6392 2429 5347], both of Jinan People's Pharmaceutical Factory (596)
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Report of 15 Cases of Primary Pontine Hemorrhage.....Bao Liping [0545 4409 1627], Wu Yingquan [6762 5391 0356], Song Donglin [1345 2639 2651] and Liu Duonan [0491 1122 0005], all of the Neurology Department, First Clinical College, Bethune Medical University (355)

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- Problems of Cutting Cross Slots on the Pole Surfaces of Turbo-generator Rotor.....Wang Tianchou [3769 1131 4693], Harbin Large Electrical Machinery Institute (17)
- The Circulating Current in the Circuit of the Commutation Elements and the Single-Layer Armature Winding.....Zheng Yaobin [6774 5069 1755], Dongfang Electrical Machinery Plant (25)
- A Method of Cross Connection for the Measurement of Temperatures of Rotors of Electric Machines by Slip-Rings CollectorYuan Gangyi [5913 0474 3015] and Li Yonggui [2621 0357 6311], both of the Dongfang Electrical Machinery Plant (27)
- Analysis of Error and Overall Accuracy of Measurements for Output of Direct-Current Power Dynamometer.....Shang Bingwu [1424 3521 2976], Harbin Large Electrical Machinery Institute (31)
- The Trial Production and Application of a New Type of Corona Suppression Tape.....Cheng Zhenhua [4453 2182 5478], Shanghai Electrical Machinery Plant (37)
- The Application of the New National Standard of the "Shaft Extension" and of the "Key" for the Small and Medium Output Electrical Machines of Established Series..... (43)

The Calculation and Machining of Sealing Face of Conical Guide Vane for Tubular Turbine.....Yao Zikang [1202 1311 1660], Hangzhou Power Generation Equipment Plant (45)

The Honing Process Used for Machining of Main Shaft.....Zhong Buqing [6945 2975 3237], Jinchengjiang Hydropower Equipment Plant (55)

The Acceleration Link and the Acceleration Time Constant of the Governor.....Wei Shouping [7614 1343 1627], Huazhong Institute of Technology (57)

9717

CSO: 4008

AUTHOR: HUANG Yuheng [7806 3768 3801]

ORG: None

TITLE: "Some Ideas on Development of Magnetic Core Storage"

SOURCE: Liaoning ZHONGXIAOXING JISUANJI [MINI-MICRO SYSTEMS] in Chinese No 1, Jan 80 pp 46-52

ABSTRACT: In spite of the advent of semiconductor memory, considerable advances were made in magnetic core storage in the United States in the 1970's. Since China's production capacities for semiconductor memory are still in their infancy, magnetic core storage should be energetically pursued. Some areas in which progress could be made are: decreasing core size, improving magnetic characteristics, increasing working currents, decreasing inductive loads and making threading easier. The temperature characteristics of recently-developed Chinese cores are described. The practical considerations which limit the size of core boards are discussed, different wiring techniques which make it possible to decrease the size of core boards are described, possible memory access schemes are reviewed, and the requirements of modular design are examined.

AUTHOR: LI Yutang [2621 0645 1016]

ORG: Northwest China Institute of Electronic Communications Engineering

TITLE: "Architecture and Developmental Trends of Minicomputers"

SOURCE: Liaoning ZHONGXIAOXING JISUANJI [MINI-MICRO SYSTEMS] in Chinese No 1, Jan 80 pp 53-69

ABSTRACT: Different trends in computer architecture are discussed using both foreign and Chinese examples. The multiple-bus, triple-bus (used in the DJS-100 system) and single-bus (used in the DJS-183 and DJS-180 systems) designs are described. Systems innovations such as cache memory, different types of word format and coding, and forms of control are described. The DJS-130 uses a combinational logic design and the DJS-183 a fixed program arrangement. The DJS-180 has hard-wired stacks. The interrupt commands of the DJS-180 system are briefly described, and the different levels of peripheral interfacing which it uses are noted. Memory implementation, addressing methods, stacks and associative memory and program loading are examined. The architecture of such new machines as the Eclipse, PDP-11/70, VAX-11/780 and the like are discussed as examples of new trends in architecture, and the software of the PDP-11 and the NOVA is surveyed.

AUTHOR: None

ORG: None

TITLE: "Communication"

SOURCE: Liaoning ZHONGXIAOXING JISUANJI [MINI-MICRO SYSTEMS] in Chinese No 1,
Jan 80 p 69

ABSTRACT: The Chinese Computer Society Held its annual meeting on 12-26 December 1979 in Kunming. Leadership committee member Comrade Wang Zhengtong [3769 2973 0681] presided. He listed 5 technical meetings that had been held in 1979 and cited popularization and publications work. More than 400 representatives of about 200 organizations attended, and about 400 papers were presented.

AUTHOR: None

ORG: None

TITLE: "Communication"

SOURCE: Liaoning ZHONGXIAOXING JISUANJI [MINI-MICRO SYSTEMS] in Chinese No 1,
Jan 80 p 69

ABSTRACT: Professor Motooka Tatsu of Tokyo University, chairman of the Japan Computer Technology Committee, conducted 9 days of technical reports and technical symposia at the Shenyang Institute of Computer Technology, Chinese Academy of Sciences, between 10 and 18 October 1979. His main subjects were multi-machine distributed processing systems and trends in future computer development (peripherals, software and hardware, applications and architecture of the next generation of computers).

8480

CSO: 8111/0197

AUTHOR: YE Chieai [5509 3589 2624]

ORG: Institute of Metal Research, Chinese Academy of Sciences

TITLE: "Three-Dimensional Measurement of Amplitude Distribution of a Rod with Holographic Interferometry"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6, Dec 80 pp 1-6

TEXT OF ENGLISH ABSTRACT: This paper introduces a quantitative analysis method for measuring the three-dimensional amplitude distribution of a rod by holographic interferometry. The optical setting is carefully designed, taking into consideration sensitivity and fringe clearness in time-average interferometric holography. As a check of the practical measurement, theoretical analyses of the vibrating modes and the amplitude distribution of the vibrating rod are calculated.

AUTHOR: LI Shuxuan [2621 2885 6513]

ORG: Dongfeng Electric Motor Plant

TITLE: "Study on a Water-based Penetrant"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6, Dec 80 pp 7-10

TEXT OF ENGLISH ABSTRACT: This paper discusses the feasibility of a water-based penetrant on the basis of the principles of wetting and penetration of liquids, surface tension and surface activation. The detecting ability of the penetrant prepared is shown by the tests.

AUTHOR: DENG Daxuan [6772 6671 1357]

ORG: Nanchang Aeronautical Engineering Institute

TITLE: "Study on the Selection of Focal Length in X-ray Photography"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6,
Dec 80 pp 11-14

TEXT OF ENGLISH ABSTRACT: Focal length is one of the important parameters in X-ray photography. It directly affects the sharpness of the X-ray photograph. In practice, the choice of focal length is correlated with that of tube-voltage and exposure. Thus, it has an effect on sensitivity. Through experimentation and discussion, the author points out the relationship between focal length and sensitivity and proposes how to select the focal length.

AUTHOR: XU Lixun [1776 4539 0534]
LI Yugui [2621 3768 2710]
ZHANG Zhuanjun [1728 1413 6511]
et al.

ORG: All of the General Research Institute of Building and Construction,
Ministry of Metallurgical Industry

TITLE: "Magnetic Particle Flaw Detector with Rotating Magnetic Field for Weld Inspection"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6,
Dec 80 pp 15-20

TEXT OF ENGLISH ABSTRACT: This report introduces a new type of magnetic particle flaw detector which produces a rotating magnetic field on workpieces with a cross-type yoke. Surface and subsurface microflaws in all directions in ferromagnetic materials can be detected in a single process. This portable detector which is good in sensitivity and efficiency can be used to inspect butt, fillet and lap welds, etc., in steel structures.

AUTHOR: WANG Genpei [3076 2704 1014]

ORG: Nanjing Automobile Works

TITLE: "The Sorting of Ferrous Materials with the Instrument Type GC-1"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6,
Dec 80 pp 21-23

TEXT OF ENGLISH ABSTRACT: Based on the physics principle of direct current coercive force and residual magnetism for the automatic nondestructive testing instrument for steel Type GC-1 and the metallurgic elementary knowledge of a ferrous alloy with different coercive forces in different chemical elements and heat treatments, this paper describes an approach of extending the use of the instrument in classifying different ferrous materials which is usually used in measuring the depth of the hardening zone for steel.

AUTHOR: None

ORG: The First Automobile Works, Changchun; Jilin University

TITLE: "Measurement of Thickness of Carburized Layer and Cyanided Layer with Electromagnetic Inductive Method"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6,
Dec 80 pp 24-31

TEXT OF ENGLISH ABSTRACT: This paper describes the basic principle of measuring the thickness of carburized or cyanided layers by means of the electromagnetic inductive method. It introduces the features of the device used and the effect of frequency temperature, etc., on the measuring results. The case depth of the samples and parts, such as gears and piston pins, are measured on-line. The test results obtained show that the accuracy is higher for testing samples, but for hardened gear the hardness of the core will affect the accuracy of test results.

AUTHOR: WANG Shixun [3769 0013 0534]

ORG: Beijing Boiler Works

TITLE: "The Plotting and Application of the DAC Curve in Ultrasonic Inspection of Welds"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6, Dec 80 pp 32-34

TEXT OF ENGLISH ABSTRACT: This article describes the direct plotting of the DAC curve on the screen which is drawn with reference to the calculated value. It also discusses the application of the curve and the method of determining the equivalent size of the defect.

AUTHOR: WANG Zhenquan [3769 2182 3123]
YI Zhan [2496 1311 1344]

ORG: Both of Shenyang Heavy Machinery Factory

TITLE: "The Ultrasonic Flaw Detection of Electroslag-welded Seams"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6, Dec 80 pp 35-38

TEXT OF ENGLISH ABSTRACT: This paper describes the experience of ultrasonic flaw detection of electroslag-welded seams gained by the author, and gives the test results. Objections and supplementation to the standard JB1152-73 on the process of flaw detection, the angle of probe, reference blocks and the determination of relative dimensions of defects are given.

AUTHOR: WANG Zhengrong [3769 1813 2837]

ORG: Dalian Diesel Works

TITLE: "Ultrasonic Inspection of Gear Blanks Made of Rare Earths Nodular Cast Iron"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6, Dec 80 pp 39-41

TEXT OF ENGLISH ABSTRACT: By means of the ultrasonic attenuation method (the multiple echo method), the internal defects of driving gear blanks made of rare earth nodular cast iron are detected. According to the degree of attenuation, the quality levels of the gear blanks and their acceptable criteria are established.

AUTHOR: ZHU Siyi [2612 1835 5030]

ORG: Zhuzhou Xiangjiang Machine Factory

TITLE: "Effect of Heat Treatment of the Alloy Disk GH-135 on Ultrasonic Attenuation"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6, Dec 80 pp 42-44

TEXT OF ENGLISH ABSTRACT: The paper deals with the correlations between ultrasonic attenuation and heat-treatment of the alloy disk GH-135. It analyzes the factors of the attenuation and puts forward the idea of determining the grain size in the material by means of ultrasonic waves.

AUTHOR: CHEN Jincan [7115 6930 3503]
JIANG Weiping [5592 0604 1627]

ORG: Both of Wuhan Institute of Physics, Chinese Academy of Sciences

TITLE: "Thickness Measuring by a Frequency-modulated Ultrasonic Method"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 no 6,
Dec 80 pp 45-47

TEXT OF ENGLISH ABSTRACT: The principle and scope of application of thickness measuring by the frequency-modulated ultrasonic method are described. The structure of the instrument designed, its accuracy and the choice of crystal are discussed.

AUTHOR: JIANG Haojie [1203 3185 2638]

ORG: Designing Section, Songjiang Electromachine Plant

TITLE: "A Detector Designed on the Partial Vibration Principle"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese Vol 2 No 6,
Dec 80 pp 48-50

TEXT OF ENGLISH ABSTRACT: A detector designed on the partial vibration damping principle is introduced. The detector is applicable to the detecting of failure of bonding in laminated products. It is a typical example of the knocking method applied to flaw detection.

9717

CSO: 4009

AUTHOR: WANG Liji [3769 4539 0679]
 ZHEN Zhen [3914 4176]
 GUO Cunlin [6753 1317 2651]
 YAN Jinglian [7051 2529 5571]

ORG: All of the National Institute of Metrology

TITLE: "RF Voltage Standard Built in NIM"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
 22 Jan 81 pp 1-8

TEXT OF ENGLISH ABSTRACT: This paper describes the RF voltage standard built in the National Institute of Metrology of China. After having investigated in detail the influence of the perturbation of the electromagnetic field on the coaxial line and the inductance of thin film bolometers, a new type of bolometer and other devices have been developed. The frequency range of this standard apparatus is 10 to 3000 MHz, and the voltage range is 0.1 to 2 volts. The total uncertainty is 0.25 to 0.7 percent.

AUTHOR: LI Deping [2621 1795 1627]

ORG: None

TITLE: "Some Properties of Spherical Ionization Chambers"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
 22 Jan 81 pp 9-17

TEXT OF ENGLISH ABSTRACT: According to spherical symmetry, the ionization current from a spherical ionization chamber is an even function of the distance from its center to the point source. Furthermore, the three components of ionization current generated respectively by secondary electrons coming from the front wall, the gas and the back wall, are all even functions of distance from source to center, even though the angular distribution of secondary electrons is anisotropic. Correction to the inverse square law can be calculated precisely with data obtained from the spherical ionization chambers exposed to a fine collimated γ ray beam. The ionization current function contains roughly a surface integral term, similar to Kondo's formula, and a volume integral term which, together with the wall attenuation effect, enables the correction to the inverse square law to be somewhat smaller than that given by Kondo's formula. The effective thickness for wall attenuation is given and the wall scattering effect is roughly estimated. The methods and possible systematic deviations in extrapolation of experimental data are discussed.

AUTHOR: HUANG Yongkai [7806 3057 2818]
SUN Bairong [1327 0130 2837]
CHAI Hongjun [2693 3163 6874]
et al.

ORG: All of the Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

TITLE: "Precise Measurement of Reflectivities of Infrared High-reflection Films"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
22 Jan 81 pp 18-25

TEXT OF ENGLISH ABSTRACT: A description is given of an optical delay line for improving the precision of reflectivity measurements. The system consists of a multi-reflection spherical cavity and is suitable for different kinds of specimens, such as concave mirrors, convex mirrors and plane mirrors. Experiments show that the system can reduce the error in reflectivity measurements to less than 5×10^{-4} at least.

AUTHOR: ZHANG Zihua [1728 2737 5478]

ORG: None

TITLE: "Slit Width Error and Its Correction in Spectrophotometry"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
22 Jan 81 pp 26-41

TEXT OF ENGLISH ABSTRACT: In order to discuss the transmission properties of the monochromator, we introduced the concept of the slit function $F_s(\lambda, \lambda_0)$. In general, it can represent the shape of the pass-band of the monochromator. In this paper we also discuss the correction for slit error when the shape of the pass-band of the monochromator is arbitrary, and a general correction formula has been obtained. In fact, Runge and Hyde's correction formulae are our special cases. There is only a little difference for the correction coefficients above the fourth order. According to the requirements of spectrophotometry, the light output energy of the monochromator should be as large and the slit width error as small as possible. The best slit setting we have proved is that the width of the exit slit is equal to that of the image of the enter slit. Finally, the paper indicates that the wavelength calibrated error of Van den Akker's method might not be only due to the asymmetry of the pass-band of the monochromator.

AUTHOR: WANG Yiqiu [3769 5030 6669]

ORG: Department of Radioelectronics, Beijing University

TITLE: "Majorana Transitions in Cesium Beam Tube"

SOURCE: Beijing JILIANXUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
22 Jan 81 pp 42-48

TEXT OF ENGLISH ABSTRACT: Majorana transitions in the cesium beam tube have been observed. Two phenomena indicating the existence of such transitions are described; these are the appearance of a subsequent peak in deflected beam intensity distribution and the asymmetry in hyperfine transition resonance intensities, which reverse when the direction of the C-field is the opposite. The conditions for producing Majorana transitions are analyzed.

AUTHOR: CHEN Senyuan [7115 2773 0337]
XU Yanjing [1776 3601 5464]

ORG: None

TITLE: "A Systematic Error Cancellation Method for Measuring Microwave Phase Shift"

SOURCE: Beijing JILIANXUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
22 Jan 81 pp 49-53

TEXT OF ENGLISH ABSTRACT: This paper proposes a systematic error cancellation method which is suitable for measuring differential phase shifts of microwave variable-loss two-port devices. The principle and the error analysis of the proposed method are described and, as an illustration, the differential phase shifts of an X-band rotary-vane attenuator have been measured with an accuracy of 0.01° over a range of 20 dB.

AUTHOR: LU Rongrun [4151 2837 3387]
LU Gangzong [6424 4854 1350]
FANG Yuzhu [2075 3768 2691]

ORG: None

TITLE: "Attenuation Measurement of a Low-loss Short Waveguide Section Under Low Temperatures"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
22 Jan 81 pp 54-60

TEXT OF ENGLISH ABSTRACT: This paper describes the basic principle, measurement technique and experimental measurement system for determining the attenuation of a waveguide section by means of measurement of Q. Three BJ-48 (WR187) waveguide sections, which were cold drawn from different materials, were tested at room temperature, dry-ice temperature and liquid nitrogen temperature. The measurement results are given. The resultant uncertainty is less than ± 4 percent.

AUTHOR: JIN Tiruo [6855 1912 5387]
XIAO Liangxi [5135 5328 3356]

ORG: None

TITLE: "Precise Compensation of the Geomagnetic Field by Fluxgate Magnetometer"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
22 Jan 81 pp 61-65

TEXT OF ENGLISH ABSTRACT: This paper describes a method for compensating the geomagnetic field. The static components of the geomagnetic field are compensated by a movable Hanselau coil. A fluxgate magnetometer is used as the null-detector, and the perpendicular variance of the geomagnetic field is compensated by the special feedback loop of another fluxgate magnetometer. Results show that the residue is less than 10 nanoteslas and the instability of the perpendicular component is less than 0.5 nanoteslas. The "following error" due to the distance between the working region and the compensating region which is not far enough can be corrected by measurements and calculation. This method has been used for the determination of γ'_p in a low field. In the final result, the following error is less than 1×10^{-7} and the uncertainty is better than 1×10^{-6} .

AUTHOR: GUO Laixiang [6753 0171 4382]

ORG: None

TITLE: "A Bridge Based on Direct-current Comparator for Resistance Thermometry"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
22 Jan 81 pp 66-74

TEXT OF ENGLISH ABSTRACT: This paper describes a bridge based on direct-current comparator for resistance thermometry. The principle of the operation and the circuit are described. The design feature of the main magnetic modulator, in which low frequency noise is less than 0.2 microampere-turns, has been emphasized in the paper. An ampere-turn autobalance control scheme performing open and closed loop adjustments by means of the main and supplementary comparator has been described in detail. Experiments show that this tracking system is reliable and stable. Measuring results indicate that the measurement error is less than 1.5×10^{-7} over the basic measuring range. Finally, a compensation circuit for further improving the ratio accuracy is also proposed, so that it is expected to obtain an accuracy of the order of 10^{-8} for the direct-current comparator.

AUTHOR: ZHOU Wei [0719 3262]

ORG: None

TITLE: "A Method of High Linear Phase Discrimination for High Frequency--The Phase Discrimination Controlled by Dividing Frequency into a Single Channel"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 1,
22 Jan 81 pp 75-79

TEXT OF ENGLISH ABSTRACT: There must be nonlinearity and a "dead range" when the linear phase comparator for frequency measurement is used to compare the phases at high frequencies. A linear phase discriminating method is described in this paper, in which the phase discrimination is controlled by dividing the frequency into a single channel, and it can overcome the above difficulties most effectively. It reduces the requirements to the transition time of the devices, improves the performances and increases the precision of the phase comparator as well. It can realize the linear phase discrimination up to 10 MHz satisfactorily. When the instrument with this principle is used to compare phase directly, the error caused by it is about 0.2 ns for one day, and the short-term error is only in the order of a picosecond.

9717

CSO: 4009

AUTHOR: None

ORG: The Cooperative Research Group of Supernormal Children

TITLE: "Summary of a Year's Research on Supernormal Children"

SOURCE: Luda XINLI XUEBAO [ACTA PSYCHOLOGICA SINICA] in Chinese No 1, 1981
pp 35-41

TEXT OF ENGLISH ABSTRACT: This study has been a cooperative research work carried out with similar research programs in 14 districts of China. Twenty-nine subjects from 4 to 15 years of age (18 boys and 11 girls) have been surveyed. A variety of methods have been used, such as experiments, observations, interviews, personality inventories and performance rating, etc.

These children appear to be quite different from one another; some of them have read a lot at early ages (often before school age); some of them have shown special abilities in mathematics; some have a talent for painting or poetry, etc. However, they still possess several common characteristics, such as: (1) cognitive interests and strong intellectual curiosity; (2) keen perception and powers of observation; (3) a broad and highly concentrated attention and unusual memory; (4) alert and initiative thinking; (5) self-confidence and perseverance, and so on. Because of such well-developed characteristics, some of these children have been allowed to start primary school learning earlier, at about 4-5 years old; some of them

[Continuation of XINLI XUEBAO No 1, 1981 pp 35-41]

skipped to junior high school at 8-9 years old, and some entered the university at around 14 years of age.

The preliminary results show:

- 1) It is clear that there are clearly intellectual deviations, and great potential for development among children.
- 2) It seems that almost all of these supernormal children have good conditions for early education. Therefore, we think that being supernormal is not simply an innate, inherent endowment which only provides a possibility for development, and early education transforms this possibility into actual supernormal results.
- 3) It seems that some personality characteristics, such as cognitive interests and perseverance, etc., are very important factors which result in superior achievement for these children.

Some suggestions for further investigation have also been made in this paper.

AUTHOR: WU Qine [6762 0530 1230]
GUAN Linchu [4612 2651 0443]
LIU Shanxun [0491 0810 1789]

ORG: All of the Institute of Psychology, Chinese Academy of Sciences

TITLE: "The Effects of Chlorpromazine on EEG's in Rhesus Monkeys"

SOURCE: Lida XINLI XUEBAO [ACTA PSYCHOLOGICA SINICA] in Chinese No 1, 1981
pp 93-99

TEXT OF ENGLISH ABSTRACT: The characteristics of EEG's at different ages were studied on rhesus monkeys (Macacas rhesus). Sixteen animals (mixed males and females) were divided into three groups according to age, i.e., newborn, immature and mature groups. The effects of chlorpromazine on the EEG's, performed on 12 of the animals, were as follows:

The frequencies of spontaneous potential on the EEG in the rhesus monkeys vary with different ages. The frequency increases and the amplitude decreases as the animal's age advances. The driving response elicited by photic stimulation is quite evident in immature animals and secondarily evident in mature animals, although it has not been observed in newborn animals.

Different changes in the EEG's of rhesus monkeys caused by chlorpromazine were

[Continuation of XINLI XUEBAO No 1, 1981 pp 93-99]

observed. The main characteristics of the EEG's consist of high voltages and slow waves. Immature monkeys suffered more effects than did mature monkeys. Chlorpromazine can improve the driving response elicited by photic stimulation.

AUTHOR: SHEN Zheng [3088 2398]
XIAO Jian [5135 0256]
LIN Shuzhi [2651 1659 5347]
WANG Lihua [3769 4539 5478]

ORG: All of the Department of Psychology, Beijing University

TITLE: "The Effects of Lithium Salt on Transmitters of Monoamines and Amino Acids in the Rat Brain"

SOURCE: Lida XINLI XUEBAO [ACTA PSYCHOLOGICA SINICA] in Chinese No 1, 1981
pp 100-106

TEXT OF ENGLISH ABSTRACT: The changes in brain transmitter contents of monoamines and amino acids were studied with materials of 111 rats seriously poisoned by lithium chloride.

The results showed that when the serum lithium level reached 2.67 ± 0.9 meq/L, and cerebellum lithium levels reached 2.05 ± 0.92 meq/kg, DA and GA were decreased while 5-HT, 5-HIAA and GABA were increased in the whole brain (decerebellum) of the experimental group. So far as each area of the brain was concerned, DA decreased and 5-HIAA increased in the Telencephalon; NE decreased and 5-HT increased in the Diencephalon; four kinds of monoamines did not display obvious changes in the brain stem, but GABA increased in all of the three areas of the brain.

[Continuation of XINLI XUEBAO No 1, 1981 pp 100-106]

The results seem to be supportive of the theory of monoamines and affective disorders. It is possible that the effect of lithium on the brain is to regulate the dynamic balance between indoleamines and catecholamines, not only to change a certain single transmitter. This is not the unique and specific mechanism of the lithium effect, because it also makes GABA increase in all of the three areas of the brain, including the brain stem.

9717

CSO: 4009

AUTHOR: ZHOU Qicheng [0719 0796 3397]

ORG: Wool Spinning Teaching and Research Group, Shanghai Institute of Textile Technology

TITLE: "Optimization of the Method of Selecting the Tooth Number Series in a Set of Change Gears. Part I: The Differences between Logarithms (D.B.L.) of the Tooth Numbers in a Set of Change Gears and the Regularity of Their Distribution"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 1-14

EXCERPT FROM ENGLISH ABSTRACT: It is often the case that technology demands an accurate multi-step change of the speed ratio between various parts of machines, textile machines in particular. A great many change gears are, as a rule, necessary for this purpose. It is desirable to minimize the number of such gears. In this paper, a method for determining the optimal combinations of the tooth number series in a set of change gears is proposed, with which the number of gears is decreased to a minimum with the precision and number of steps of the speed ratio remaining unchanged. The proposed combinations are supported by mathematical proof.

This is the first of a series of reports. It deals with the regularity of distribution of the speed ratio series when a definite number of change gears are used. A table illustrating optimal combinations of the D.B.L. of the tooth numbers with corresponding gear numbers up to 20 in a set is presented.

AUTHOR: YU Ming [0205 2494]

ORG: Postgraduate, Mechanical Principles and Spare Parts Teaching and Research Group, Shanghai Institute of Textile Technology

TITLE: "On the Efficiency of Planetary Gear System"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 15-24

TEXT OF ENGLISH ABSTRACT: In order to raise the efficiency of the planetary gear system, the main factors concerning the efficiency should be determined. With the analysis of the forces on the gear systems, two kinds of such systems are treated here. As a result, a new formula is established, by virtue of which the relation between the efficiency and the structural parameters of the gear system is found out. It shows that the efficiency does not depend merely on the transmission ratio, but also on the actual structure. The difference of the pitch diameters of the two planet pinions and the arm length are the two essential parameters. Their proper selection would greatly improve the efficiency of the gear system and may, in turn, lead to its optimum structure. Inasmuch as the essence of a planetary gear system can be illustrated with an equivalent lever, the foregoing conclusion can find an easy explanation in a comparison between the efficiency of a gear system and that of a simple lever system.

AUTHOR: DAO Dekun [6670 1795 6924]

ORG: Machinery Teaching and Research Group, Shanghai Institute of Textile Technology

TITLE: "Designing the Four-Bar Linkage Beating-up Mechanism by the Kinematic Inversion Method"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 25-33

TEXT OF ENGLISH ABSTRACT: When designing a new weaving loom, the corresponding angles of the crank shaft and the rocking shaft at the four positions--front center, the starting point of weft insertion, back center and the end point of weft insertion--are often given for the timing requirements of weft insertion, shedding mechanism and so on. Designers of the four-bar linkage beating-up mechanism should take pains to satisfy these requirements.

This paper deals with the application of kinematic inversion to the design of the four-bar linkage beating-up mechanism. A series of related coordinate equations for the mechanism have been derived, and the method for solving the nonlinear algebraic equations is presented. Finally, an example is included to illustrate the practical application of the theory.

AUTHOR: HUA Danian [7458 1129 1628]

ORG: Mechanical Principles and Spare Parts Teaching and Research Group, Shanghai Institute of Textile Technology

TITLE: "A Theory for Designing Linkages in the Flat Grinding Machine"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 34-42

TEXT OF ENGLISH ABSTRACT: The device for driving flat in the flat grinding machine is composed essentially of a slider-crank mechanism and two rotating guide mechanisms. It is found that, kinematically, the combination of a slider-crank mechanism and one of the rotating guide mechanisms may be equated approximately to a sine mechanism, and the above-mentioned combination, in association with the other rotating guide mechanism, may be useful in creating approximately uniform motion for its output member in its working stroke. To this end, the size parameters, the rate ratios and the relative phase positions of these mechanisms are defined in the article.

The author also derives a formula for calculating the velocity of the flats. In addition, consultative discussions and criticisms on the previous similar formulae are proposed here.

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 3, Sep 80 pp 34-42]

Based on the results of such research, the author has analyzed size parameters of the existing flat grinding machine, and some of them have been found unreasonable. Corrective measures to be adopted in designing a new one have therefore been presented.

AUTHOR: JIANG Fanchang [1203 4907 2490]
SHAO Kuan [6730 1401]
LU Linhui [4151 7792 1920]
XU Shengmin [6079 3932 3406]
ZHU Zhanyun [2612 0594 0061]
GUO Maoquan [6753 5399 0356]
LUO Suyu [5012 4790 3768]

ORG: JIANG, SHAO, LU and XU all of the Shanghai Institute of Textile Technology;
ZHU and GUO both of the Zhu Zhou Ramie Textile Mill; LUO of the Hemp Institute,
Chinese Academy of Sciences

TITLE: "A Preliminary Study on the Physico-chemical Properties of Ramie Fibers"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE
OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 43-53

TEXT OF ENGLISH ABSTRACT: This paper deals with the test of the chemical components and the analysis of the mechanical and physical properties of the fibers of 10 main varieties of China's rames. The qualities of the fibers of each variety are enumerated. It is found that there exists a significant difference in chemical components and physical properties from one variety to another. Different parts of the plant (i.e., root, stem and tip) are each characterized by their fineness and breaking strength.

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 3, Sep 80 pp 43-53]

In view of their long staple length, high fiber length irregularity, small breaking elongation and considerable initial modulus, it is beneficial for the same fibers to be blended with polyester fibers.

AUTHOR: YAN Haojing [0917 3493 2529]
WU Ancheng [0702 1344 2052]
SONG Xiueai [1345 0208 1752]

ORG: All of the Shanghai Institute of Textile Technology

TITLE: "A Study on Setting Characteristics of Xinjiang Wools Treated with Water and NaHSO_3 Solutions at Elevated Temperatures"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 54-64

TEXT OF ENGLISH ABSTRACT: In order to obtain the required handle of the fabrics made from wools produced in Xinjiang Province, it is usually necessary to repeat the treatment of the fabrics in wet finish processes. It has been found in practice that the fabric handle can be substantially improved by adding to the fabric a sufficient amount of NaHSO_3 in crabbing, but the strength and wear resistance of fabrics treated in this way are somewhat reduced.

In this paper, the setting characteristics of Xinjiang wool in comparison with Australian wool are investigated. The yarns of these wools were treated with steam and water, as well as with NaHSO_3 solutions of different concentrations, and their lengths, strengths and dynamic properties were measured. The results revealed that the portion of elongation remaining in the Xinjiang wool yarn was

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 3, Sep 80 pp 54-64]

greater when the treatments were carried out under stretched conditions, and the set lengths of the Xinjiang wool were shorter when the treatments were carried out without tension. In addition, the setting of the yarns seemed to be more effective when they were treated with NaHSO_3 solutions. The degree of set of the Xinjiang wool appeared to be comparable to that of Australian wool when treated with concentrated NaHSO_3 solutions.

AUTHOR: TANG Zhenmin [3282 2182 3046]
CAO Shouzhun [2580 1108 3791]

ORG: Both of the Shanghai Institute of Textile Technology

TITLE: "An Investigation of Technical Parameters Affecting the Characteristics of Textured Cotton Stretch Yarn"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 65-71

TEXT OF ENGLISH ABSTRACT: Cotton fiber is a kind of non-thermoplastic fiber. By special treatment with the false twisting and resin finishing method, the cotton yarn can be made into corkscrew curls and thus becomes highly elastic.

This paper discusses the effects of some important technical parameters (such as yarn construction, number of false twists, components of resin liquor, heatsetting temperature, parameters of fabrics, etc.) on the characteristics of textured cotton stretch yarn. In addition, it has been shown that the elasticity and strength of textured cotton stretch yarn will be severely influenced if inappropriate technical parameters are applied.

AUTHOR: CHEN Ming [7115 2494]
XIA Jinguo [1115 6855 0948]

ORG: Both of the Shanghai Institute of Textile Technology

TITLE: "Preliminary Research on Metap Machines. Part II: The Principles of the Knit-Weaving Technique and a Discussion on How to Design Metap Machines"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 72-82

TEXT OF ENGLISH ABSTRACT: Metap has broken away from the principles underlying the operation of both weaving looms and shuttleless looms. It represents a brand-new fabric-making machine, having integrated the technique of weaving and that of warp knitting into one.

In order to facilitate further discussion on the working principles and mechanical characteristics of the machine, we have proposed the dividing of the entire knit-weaving process into 10 steps, which are analyzed one by one. Such an analysis will aid designers of the machine in determining its general construction and main dimensions.

A description of the main features of Metap fabrics is given at the end of this paper.

AUTHOR: ZHANG Peiliang [1728 0160 5328]
YANG Sirang [2799 1835 6245]
SUN Weiqing [1327 3262 0615]
GU Dingfang [7357 7844 5364]

ORG: All of the Shanghai Institute of Textile Technology

TITLE: "A New Photoelectric Hairness Tester"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 83-91

TEXT OF ENGLISH ABSTRACT: In this paper the following points have been dealt with:

1. A brief description of the significance of hairness in production and scientific research;
2. The concept of hairness;
3. Guidelines in designing the photoelectric hairness tester, including its construction and operating principles;
4. A brief explanation of the functions of various constituent parts of the tester;
5. The tester can be used as a projecting-visual one with 30x magnification, or as a measuring instrument, with the distinguishing features of the hairness index being digitally displayed, and continuous regulation of the length of hairness and stepped speed change of the processing of yarn.

AUTHOR: JIANG Zonghao [5592 1350 6275]
CHEN Ruiqi [7115 3843 3825]
YE Yixiang [5509 4135 7449]

ORG: All of the Shanghai Institute of Textile Technology

TITLE: "An Optical-Electric Apparatus for Measuring the Locus of Spindle Vibration at Its Top"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 92-98

TEXT OF ENGLISH ABSTRACT: This paper brings out an apparatus which contains a silicon measuring cell and amplifier, and can display the moving locus of the vibrational body on an oscilloscope. This apparatus is mainly used to measure the amplitude of the spindle along the x and y axes, to analyze the stability of the motion, and to investigate the self-excited vibration of the spindle. It may also be used to measure any other high speed rotational body.

AUTHOR: ZHANG Weiyuan [1728 3262 3293]
CHEN Yuanfu [7115 0337 3940]

ORG: Both of the Shanghai Institute of Textile Technology

TITLE: "A Simple Method for Measuring the Acceleration of the Picker"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 99-102

TEXT OF ENGLISH ABSTRACT: This paper deals with a simple method for measuring the acceleration of the picker by means of an RC differential circuit composed of a resistor and capacitor. By inserting a potentiometer in the circuit of displacement and raising the voltage of the source appropriately, it has been made possible to carry out direct measurement, which used to be a knotty problem since it was impossible to measure without using an amplifier because of the weakness of signals. Being easy to operate and immune to external interference, the method can achieve an accuracy of response characteristics up to 90 percent and above. The method may also be used for measuring the acceleration of a straight-line motion.

AUTHOR: XIAO Ruojian [5135 5387 7003]
HU Zhongtian [5170 0022 3944]
GU Wei [7357 0251]
HUANG Xiyun [7806 7209 0061]
LU Weiping [4151 5898 1627]

ORG: XIAO of the Shanghai Institute of Textile Technology; HU of the Institute of Metallurgy, Chinese Academy of Sciences; GU, HUANG and LU all of the Shanghai Main Petrochemical Works

TITLE: "Measuring the Sodium of Sulfonic Acid Groups in PAN Fibers Indirectly by means of Atomic Absorption Spectrometry"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 103-108

TEXT OF ENGLISH ABSTRACT: The content of sulfonic acid groups in PAN fibers has a remarkable bearing on their dyeing behaviors. The content is usually measured by the chemical analysis method, i.e., subjecting the fiber to acid-basic titration after ion exchange and determination of sulfur by gravimetric analysis. This method, however, suffers from complexity in operation and lack of accuracy. Due to their existence in the form of RSO_3Na within the fiber, the contents of the sulfonic acid groups can be indirectly found by measuring the content of sodium in the fiber.

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 3, Sep 80 pp 103-108]

In this paper, the way of measuring sodium by means of the atomic absorption spectrometry method is presented. A preliminary assessment is made of the influence of the fiber matrix and flame condition on the measurement, and the working parameters of such indirect measurements are thus defined. An analysis of the samples has yielded satisfactory results.

AUTHOR: LI Fanting [2621 4907 0080]
CHENG Zhengdi [4453 2973 6611]
ZHANG Yu [1728 3842]

ORG: LI and ZHANG both of the Shanghai Institute of Textile Technology; CHENG
a Postgraduate, Shanghai Institute of Textile Technology

TITLE: "The Process and Mechanism of Fiber Fracture"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE
OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 109-124

TEXT OF ENGLISH ABSTRACT: This article reviews the chemistry, morphology, kinetics
and thermodynamics of polymer fiber fracture. Some mathematical and physical
models relating to fiber fracture are given.

Generally, the fiber fracture can be divided into three steps: the formation of
incipient microcracks, slow growth of cracks, catastrophic breaking in fibers.
The mechanical treatment of polymer fibers results in chain scission accompanied
by formation of reactive free radicals and some end groups. This phenomenon has
been investigated with ESR spectroscopic detection and IR spectrum. The structure
and morphological changes of stressed polymer fibers have been studied by SAXS and
SEM. Efforts are made to study fracture kinetics at different stresses and temper-
atures. On treating the experimental data kinetically, fairly good agreement of

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 3, Sep 80 pp 109-124]

micro-kinetics with macro-kinetics of fractures is obtained. Thermal effects
which accompany the polymer fiber fracture have been investigated by means of
calorimetric measurements and by inertialess detection of IR radiation.

From the point of view of probability and statistics, the mathematical and physical
models relating to fiber fracture have been reviewed and their defects are pointed
out. The authors believe that the stochastic process will prove to be an ideal
tool in the study of polymer fiber fracture.

AUTHOR: SUN Tong [1327 2717]
ZHOU Hanxin [0719 3211 2450]
QU Fengzhen [1448 7685 3791]

ORG: All of the Shanghai Institute of Textile Technology

TITLE: "Reactivation of the Potential Cross-linking Agent MDI-Acetone Oxime Addition Compound and Chemical modification of Elastomeric Polyurethane Fiber by means of Formation-Cross-linking"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 3, Sep 80 pp 125-128

TEXT OF ENGLISH ABSTRACT: In a previous paper we have shown that the potential cross-linking agent (MDI-acetone oxime addition compound) is stable enough in a spinning solution of elastomeric polyurethane fiber and can be deposited in the as-spun fibers during the course of fiber formation in the coagulation bath.

In the present paper the following problems are studied by means of DSC, I.R. spectra, TGA, TBA and stress-strain measurements:

1. Studying the possibility and necessary conditions for the regeneration (i.e., reactivation) of free-NCO groups from the MDI-acetone oxime addition compound and the irreversibility of this reactivation process under given heat-treatment conditions of elastomeric polyurethane fiber;

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 3, Sep 80 pp 125-128]

2. Finding out the evidence of existence of cross-linking reaction between reactivated MDI-acetone oxime addition compound and polyester-urethane block copolymer;
3. Developing a new method of chemical modification for man-made fibers (i.e., a formation-cross-linking method) and applying this method to the modification of elastomeric polyurethane fibers.

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EXPANSION COMPLETED ON GUANGZHOU SATELLITE OBSERVATION STATION

Hong Kong TA KUNG PAO in Chinese 4 Mar 81 p 3

[Text] The Guangzhou Satellite Observation Station of the Chinese Academy of Sciences has been completed. Located at Yingpanding in the northern suburbs of Guangzhou, the site originally was the location of a small, primitive observation station built in 1958 to observe the world's first artificial satellite. In 1975, as part of the Chinese Academy of Sciences' scientific development program, expansion was undertaken to provide for a modern satellite observation station. After several years, four sets of heavy precision instruments designed and built in China were finally installed. This equipment has been put to use to supply large quantities of scientific data to national scientific research projects.



Technical personnel use satellite laser tracking instruments to determine the distance to the satellite.



Radio dual frequency doppler velocity finder designed and built in China is part of the satellite velocity equipment installed in the satellite observation station.

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